Suggested reading

Listed are synopses of recent papers and books that should be of interest to the readers of the *IBM Systems Journal*. Inquiries should be directed to the publications or publishers cited.

Software psychology, Ben Shneiderman (University of Maryland), Winthrop Publishers, Inc., Cambridge, MA, 1980. 320 pp. (ISBN 0-87626-816-5). Software psychology as defined by Ben Shneiderman is "the study of human performance in using computer and information systems." This subject primarily encompasses, as does his book, software development, query facility usage, and interface design. The book is a study in the application of psychology to computer science to facilitate the use of computers. Extensive reporting of experimental results in the areas discussed make this book interesting and informative. Each chapter closes with a summary for the practitioner and an agenda of suggested experiments or areas to be explored for the researcher.

The presentation begins with an introduction to the subject and a discussion of research methods used. The author then presents a model of human cognitive behavior as related to programmer behavior. Other programming issues include programming style, team organization, and software quality measurements. After a thorough introduction to data bases and data models, the author relates human factors to data bases and their query languages. The final chapters explore psychological and hardware issues in designing interactive interfaces. The two most informative chapters are those on quality measurements and designing interfaces. In total, the book provides an excellent synthesis of experiments and their results, yet is most readable and of interest to those in the field and in research.

SQL/DS—what it means, Edgar F. Codd (RES San Jose, CA), *Computerworld* **15,** No. 7, 27-30 (February 1981). In this article, Dr. Codd, who has been closely associated with IBM's research on relational data bases, describes IBM's first relational data base product. Discussed in the article are the capabilities of SQL/DS, its relationship to other IBM products, and its evolution from some of IBM's research work.

Analyzing IBM 3270 performance over satellite links, George Deaton and David Franse (SCD Raleigh, NC), *Data Communications* **9,** No. 10, 117-132 (October 1980). A major factor in the use of satellites is the effect of propagation delay on network performance. Simulation and analytic models have been used to study this effect in performance of satellite and terrestrial links on the end user. This paper discusses the use of an event-driven simulation model to study the effects of propagation delay on the performance of IBM display terminals using the BSC and SNA/SDLC disciplines. The paper also provides guidelines for network designers to maximize performance over satellite links.

In search of the missing link control standard, Bert D. Moldow (IBM Systems Research Institute, New York), *Data Communications* **9,** No. 12, 93-105 (December 1980). Link control is an architectural layer in a telecommunications protocol that permits higher-level layers to access media for transporting messages without concern for their semantic content. This basic layer of the protocol provides for access control and addressing and error control. Although efforts are underway to develop standards for link control, there is no global solution. Thus new types of link control join existing protocols. This paper discusses alternative link control procedures and suggests areas where new technologies are leading toward new approaches to link control. Several such approaches are discussed.

Improved optimization of FORTRAN object programs, Randolph G. Scarborough and Harwood G. Kolsky (IBM Scientific Center, Palo Alto, CA), *IBM Journal of Research and Development* **24,** No. 6, 660–676 (November 1980). Although the FORTRAN H Extended compiler has produced highly optimized object programs for IBM System/360 and System/370 computers, a study has revealed that important additional optimizations are possible, and the compiler has been enhanced accordingly. These improvements include an extension of the range of cases handled by the optimization techniques, the addition of several new optimizations, and the removal of certain optimization restrictions. This paper describes these improvements and reports their effects.

A business language, N. J. Denil (GSD Atlanta, GA), *IBM Journal of Research and Development* **24,** No. 6, 732–746 (November 1980). The paper describes a language and supporting interactive system for use by the small businessman. To aid in understanding, it is possible to run an application in single-step mode. The system also guides the user through program modification by diagnosing inconsistencies. The language is described in the first part of the paper. Example user sessions are outlined, and the prototype implementation and some design issues are discussed.

Computer graphics applications, I. M. Miller (DPD Harrison, NY) *Journal of Systems Management* **31,** No. 11, 22–35 (November 1980). This paper discusses graphic support by analyzing the kinds of applications to be done with graphics. The author categorizes these applications into image, transformation, drafting or representation, and reporting. The author describes these categories with many examples and then discusses the device support and user support needed.

A close look at IBM's color graphic offerings, Frank Rossiter (IBM United Kingdom Laboratories, Ltd., Hursley, England), *Mini-Micro Systems* **13,** No. 12, 116–128 (December 1980). This issue of *Mini-Micro Systems* contains a special report consisting of six articles on graphic systems. One of these articles discusses the three new visual aspects of IBM data display: color, extended highlighting, and symbols and pictures. These were announced in November, 1979, with the announcement of the 3279 color display station. Design innovations required for a high-quality color display and the software developed to support symbols and pictures are subjects of this article.

Software engineering education, Harlan D. Mills (FSD Gaithersburg, MD), *Proceedings of the IEEE* **68,** No. 9, 1158–1162 (September 1980). Discussed are concepts of software engineering and commonalities and differences between university and industrial education in software engineering. This is a special issue of the *Proceedings* on software engineering containing 13 papers on the product, process, and know-how of software engineering. It includes a special introduction by guest editor Laszlo Belady of the IBM Thomas J. Watson Research Center.